

University Campus Number Plate logging System

B.Santosh manoj kumar, M.V.K.Prasad, K.Sripath Roy

Abstract: Automatic number plate Recognition is an image processing with OpenCV technology. The main objective is to design an efficient automatic authorized number plate identification system. This system is implemented on the entrance for security control of the University Campus. The developed system primarily detects the moving vehicle at the entrance and then captures the vehicle number plate image. Vehicle number plate region is extracted using the image and video segmentation in an image. Optical character Recognition technique is used for the character recognition. The resulting data is then used to store on a database so as to come up with the specific information like the vehicles number plate time taken and frequency of the data. This system is implemented and simulated by using the technologies like OpenCV, Tensorflow, mongoDB and its performance is tested on real images and videos. It is observed from the experiment that the developed system successfully detects and recognizes the vehicle number plate on real images and videos.

Index Terms: Tesseract-OCR, Image processing with OpenCV, Tensorflow, mongoDB.

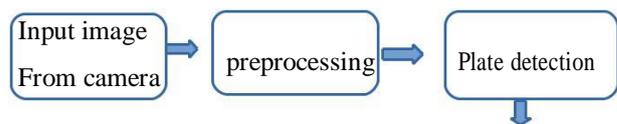
I. INTRODUCTION

This paper projects about how we detect the number plate of different vehicles and storing them in the database. The ideology of the project had come up with the difficulties faced by the security to record the numbers of various vehicles at the gate way of the campus. Sometimes the user might not be able to record the data due to various inferences such as bad vision, Light factor, bad interpretation, failure to record the data when there are multiple buses at an instance. This might not be considered as a serious issue but in case of failure of recording the data at gate ways where there is large scrutiny and high security it may lead to some serious security issues. So in order to avoid such circumstances we develop a module that detects the number plate of the vehicles that are passing through the gate. With in the module we shall employ an algorithm that detects the vehicles and captures the images of the number plate. Besides it also makes a record of incoming and outgoing of that particular vehicles with regardless of manual work and automatically stores them in the database. The KNN algorithm which means K-Nearest Neighbour algorithm is employed along with CNN which means Convolution Neural Network are used in this project.

recorded manually where there are chances of entering the wrong information into the records or even manipulation of data can also take place. With the help of this model we can avoids manipulations and also maintain the accurate data of the vehicles and also store this data with the help of database.

II. PROPOSED SYSTEM

The main objective of the system is to recognize the number plate. Here recognition refers to capturing the number plate and identifying the characters and numerals present on the plate. In general, we find number plates in white and yellow colors where characters are printed in black. The whole recognition process follows as per the block diagram shown in Fig. 1.



The most challenging task is to detect the number plates of the moving vehicles. if there are multiple vehicles at an instance there are chances where a human eye may not capture the precise data so there is a prospect of entering incorrect data into the log book. In order to avoid such situation we need to develop the algorithms so as to record and store the precise information in to the database. Here we are about to implement this model with in the campus to recognize the vehicles passing through the gate. In a day there may be approximately hundreds of vehicles that enter and exit through the gate and all this information is

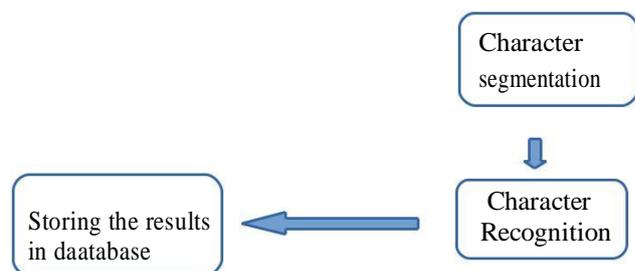


Fig.1. Block Diagram of Proposed System

1. vehicle image capture

In order to capture the images of the vehicles we must employ high resolution LPR cameras which are designed to recognize them at the gate way and takes an image of the vehicle as shown below.

Revised Manuscript Received on May 07, 2019.

B.Santosh manoj kumar studying B.Tech,in Electronics and Communication Engineering stream from Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, AP, India.

M.V.K.Prasad studying B.Tech in Electronics and Communication Engineering stream from, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, AP, India.

K.Sripath Roy, Assistant professor in Electronics and Communication Engineering and Associate Dean projects , Koneru Lakshmaiah Education and Foundation, Vaddeswaram ,Guntur,AP,India.



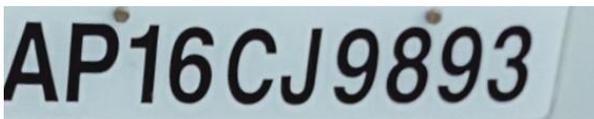
Fig.2.1.Input image

2. Preprocessing

Here , the captured image will undergo few steps such as contrast enhancement, noise reduction, resizing the image. Initially the captured image is in RGB mode and this has to be converted into a grey scale image.

3. Plate Detection

In order to detect the license plate from the image that is captured we need to get the accurate location of the plate and also the plate may be of different shapes but majorly it is found in rectangular shape . Here image segmentation plays a key role so as to detect the plate from the image. The segmented image is shown below.



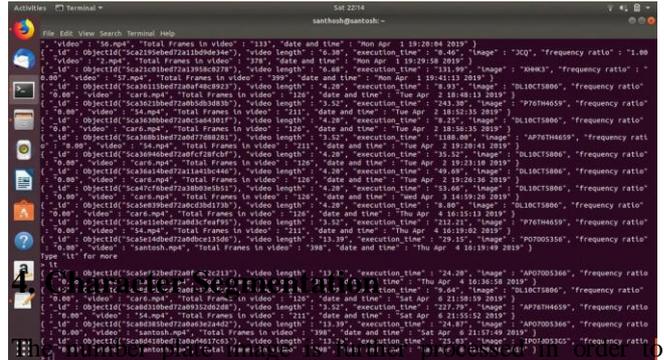
5. Character Recognition

An automatic license plate recognition system must recognize alphanumeric characters. The character image is compared with the training set and the best similarity is measured and according to this recognized character is displayed.



7. Storing the results in mongoDB database

plate, cropped image, and frequency of the number plate, execution time ,date and name of the video in the Pymongo database.



identify the characters present on the board for this method we make use of Image scissoring. This scissoring process the license plate is scanned vertically and each alphabet and numerals are segmented.

III. TOOLS REQUIREMENTS

1. OpenCV

It is an opensource computer vision and library programming functions which mainly aims at real time images. It is opensource library which is used for image processing. This mainly deals with how a computers reads high level programming into the digital images.

OpenCV python is an python API used for the implementation of openCV interms of python. This can be even implemented by using c++, java but the reduction of code process results in running time.

2. Tensorflow

Tensorflow is the machine learning framework and used to design, build ,and train deep learning models It can use do to numerical computations, which in itself doesn't seem all too special, but these computations are done with the dataflow graphs. and we used Tensor flow algorithms are i.e KNN and CNN.

3. Python Image library

Python image library is a package that exposes many functions to manipulate images from a python script.

4. MongoDB database

mongoDB is an opensource software. It is cross-platform which uses JSON like Schema. It means fields vary from document. and It is distributed database at its core.so easy to use. It is NO- SQL database which do not have table and rows and the database is in the form of collections and documents.

After We got the Recognizing the characters in number plate from our main function and we then store the Name

IV. IMPLEMENTATION

In Automatic Number Plate Recognition we used two main algorithms KNN, CNN. There are lot of algorithms used in the concept of machine learning. But while coming to our Number plate recognition. So as to detect the characters, stored in the form of frames. KNN and CNN are the different types of neural network consists of 3 layers. That is 1. Input layer, 2. Hidden layer, 3. output layer.

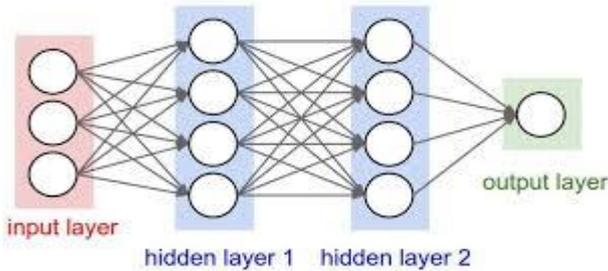


Fig.4.1. Neural Networks

KNN is also a type of neural network it is also have comprise of all 3 layers. In these every layers is consisting of nodes and these nodes are interconnected to one by one. And these nodes consists the particular weights. So when an image is detected it forms different interconnected images or pixels or nodes. So when we use KNN it takes the data what we need later it trains and then tests. Takes the data which is near to it, which in term we define it as nearest neighbour. So while taking the data it misses out some part of the data. Then we do not get the accurate results. and for further information simplification in the detection of an image we used an another algorithm and a type of neural network CNN where it can be like it is the multiplication of data.

Here in this data all the nodes are interconnected to each by each layer. So that when we give 'm' layers it finally reduces to 'm-1' layers.

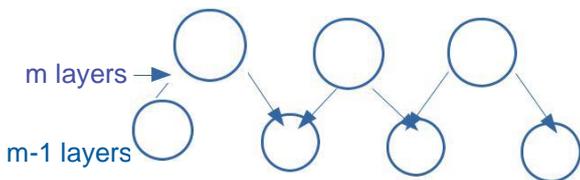


Fig.4.2. Layers

By each node get to know the edge detection, of an image, so that each layer has its own nodes. Suppose if we consider about 28x28 pixels it reduces to (0-9) layers. So each nodes is given its weight. when we want to get an image out we need to give input to the nodes and it neat go to the hidden layers and then to the output layers. Each node weights must be given that it could multiply the layers of every nodes. The process continues till the we get the perceptive and Non-perceptive goals. So by this we can even convert a blur image in plane image by using Kernal convolution. So that these are converted like Networks and these are called convolution networks. Where every data of an image is stored and hence, the number plate date is divided into frames and then it is used for the display of Automatic number plate Recognition. So it takes every data into consideration and detects the required image. So for the

alphanumeric and for calculating each frames. we need some mathematical computation. So for mathematical computation and detection of characters we use KNN and CNN Algorithms. Here KNN is K-Nearest Neighbour so in the detection of number plate each and every dimension is

V. RESULTS AND DISCUSSION

An image of a vehicle is taken and is given as an input.



Fig 5.1 Input image

detection of number plate in all dimensions we use convolution neural network.

While considering the Tesseract OCR is used. The image is first preprocessed and the license plate is detected from the preprocessed output. Presently we have a grayscale picture and a threshold picture. Next we apply the find contour function capacity of OpenCV to identification every one of the limits in the thresholder picture. This process to separate the characters from the picture with goal that they can be perceived. After that they are sent to character segmentation. and Here we begin with every conceivable plates. We crop the plate from information picture and resize it to 1.6 height, 1.6 width. The we again apply the preprocessing activities on the plate image. For character Recognition ,Tesseract OCR is an optical Character recognition tool of OpenCV. This tool recognizes the data and displays it in image box is shown in below.

Result 1:



Fig5.2. Simulated output 1

Result 2:



Fig 5.3.Simulated output 2

Result 3:

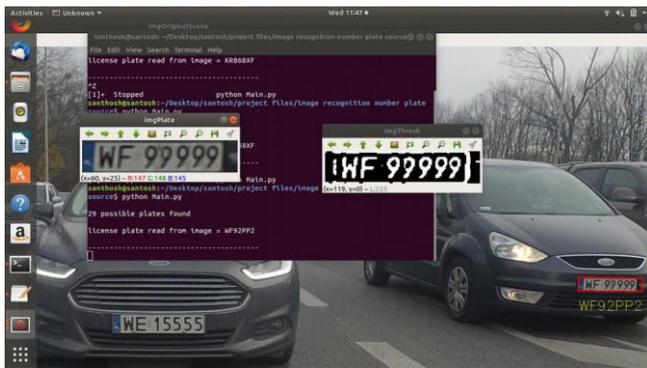


Fig.5.4.Simulated output 3

VI. CONCLUSION

The message of this research is to show that free and open source technologies are matured enough for scientific computing domains. The system works satisfactorily for wide variations in illumination conditions and different types of number plates commonly found in India. It is definitely a better alternative to the existing proprietary systems, even though there are known restrictions.

	Yes	TS 2BA3939	
	Yes	MH12DE1433	
	Yes	AP16DL6377	
	Yes	TS07FD5038	
	Yes	AP16TD0649	

	No	-----	-----
--	----	-------	-------

Table 1. challenging of sample results detected and Non-detected plates.

VII. FUTURE SCOPE

Implementing for the detecting of number plate for multiple vehicles in a single video. Live implementation processing of the project with the digital advanced cameras.

VIII. ACKNOWLEDGEMENT

We sincere thanks to our guide K. Sripath Roy sir, Associate Dean Projects in Electronics and Communication Engineering for his valuable and Motivation through out the completion of this project. and In this project mainly Supported contributors are Saquib Nadeem Hashmi, Siddhant Khandelwal, Kaustubkmr.

IX. CHALLENGES

Plate in Image	Plate detected?	result	Original Results of detected plate
	Yes	AP29 AM 4254	
	Yes	AP16FD5020	
	Yes	AP16CJ9893	

REFERENCES

1. Systems(ICCAS). 17-20 Oct. 2018.
2. Thanh-Nga Nguyen, Duc-Dung, A New Convolutional Architecture for vietnamese car plate Recognition. IEEE International Conference on Knowledge and Systems Engineering(KSE) 1-3 Nov. 2018.
3. Sanghyeop Lee, Keumyoung Son, Hyuntae, Jangsik Park. Car plate recognition based on CNN using embedded system with GPU.IEEE International Conference on Human System Interations(HSI).17-19 July 2017.
4. Sanghyeop Lee, Keum-young Son, Byung-Woo Yoon, Jangsik Park. Video Based License Plate Recognition of Moving Vehicles Using Convolutional Neural Network. IEEE International Conference on Control, Automation and
5. Yoshihiro Shima. Extraction of number plate images based on image category classification using deep learning.2016 IEEE International Symposium on Robotics and Intelligent Sensors(IRIS) 17-20 Dec. 2016.

6. Zied Selmi, Mohamed Ben Halima, Adel M. Alimi. Deep Learning System for Automatic License Plate Detection and Recognition. 2017 14th IAPR International Conference on Document Analysis and Recognition (ICDAR). 9-5 Nov. 2017.
7. Palaiahnakote Shivakumara, Dongqi Tnag, Maryam Asadzadehkalijahi, Tong Lu, Umapada Pal, Mohammad Hossein Anisi. CNN-RNN based method for license plate recognition. CAAI Transactions on Intelligence Technology (volume: 3, Issue:3 ,9 2018). page(s): 169-175 29 November 2018.
8. Yujie Liu, He Haung . Car plate character recognition using a convolutional neural network with shared hidden layers. IEEE 2015 Chinese Automation Congress(CAC). 27-29 Nov. 2015.
9. Jie Liu , Xin Li, Hao Zhang, Chengcheng Liu, Lei Dou, Lei Ju. An Implementation of Number Plate Recognition without segmentation Using Convolutional Neural Network. 2017 IEEE 19th International Conference on High Performance Computing and Communications, IEEE 15th International Conference on Smart city, IEEE 3rd International Conference on Data Science and Systems (HPCC/ SmartCity/ DSS). 18-20 Dec. 2017.
10. SaquibNadeem Hashmi, Siddhant Khandelwal, Kaustubkmr. Automatic license plate Recognition. <https://github.com/Deevolution/ALPR>. Feb 4, 2018 - Apr 8, 2019.